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ABSTRACT

Twelve construction cluster skill standards and associated benchmarks were developed as part of a federally funded school-to-work initiative that included the following parties: the Chicago Public Schools; City Colleges of Chicago; and business, labor, and community organizations. The standards, which include core academic, generic workplace readiness, and core industry standards, are as follows: (1) understand and communicate effectively orally, in writing, and graphically in standard English; (2) demonstrate knowledge and use of mathematical operations, measurement, algebraic and geometric methods to solve real-world problems; (3) understand and apply the fundamental concepts, principles, and processes of science to the construction industry; (4) demonstrate creative thinking, problem solving, decision making, and visualization; (5) apply computer literacy skills and knowledge; (6) demonstrate knowledge and skills to make viable career choices and obtain employment in the broad construction industry; (7) demonstrate personal qualities of self-esteem, self-management, and responsibility; (8) demonstrate acceptable behavior governed by the rules of society and the workplace; (9) demonstrate an understanding and ability to work with others; (10) demonstrate knowledge of the construction industry, related careers, and economic issues that affect the industry; (11) apply technical skills and knowledge used in the industry; and (12) understand and apply safety measures. (MN)

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Construction Cluster Skills Standards

Built Environment Partnership
DePaul University

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CONSTRUCTION CLUSTER SKILLS STANDARDS

Built Environment Partnership
DePaul University
1999

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INTRODUCTION

The Built Environment Partnership is a federally funded school-to-work/education-to-careers initiative in Chicago, IL, designed to encourage educational reform that will result in improved academic and career outcomes for all learners. Under the leadership of DePaul University, it brings together Chicago Public Schools, City Colleges of Chicago, business, labor and community organizations.

Unlike other STW/ETC initiatives, the Built Environment Partnership focuses its activities on a particular cluster of occupations known as built environment. As such, career and work-based activities promote career opportunities in fields related to the broad construction industry including those in: design, management, construction trades, maintenance, and real estate. While gaining valuable, transferable skills, students help rebuild their communities and reconnect with their environment.

To provide a tool for program improvement and articulation to further education or employment, the Built Environment Partnership identified industry cluster standards for use with high school level students. These standards known as the **Construction Cluster Skill Standards**, lay the foundation for the preparation of youth for entry level jobs, apprenticeships or post-secondary education in a related field. As such, they allow learners a high degree of career transferability and advancement.

The first step in the process was to review existing academic, workplace, career and industry standards from national and state sources including:

Core Curricula Competencies
National Center for Construction Education and Research

Hawaii Construction Industry Skill Standards
Building and Construction Technology Industry Skills Committee

Workplace Skills
Illinois State Board of Education

Illinois Career Development Competencies
Illinois State Board of Education

Illinois Learning Standards
Illinois State Board of Education

Expecting More, Higher Standards for Chicago's Students: Chicago Academic Standards and Frameworks
Board of Education of the City of Chicago

Wisconsin's Model Academic Standards for Technology Education
Wisconsin Department of Public Instruction

Education for Employment Task Lists
Illinois State Board of Education

What Work Requires of Schools: A SCANS Report for America 2000
Secretary's Commission on Achieving Necessary Skills, U.S. Department of Labor

Illinois Plan for Industrial Technology Education
Illinois State Board of Education

These were then consolidated, reviewed and modified by a task force of educators, community members and industry persons representing the various segments of the built environment/ construction cluster.

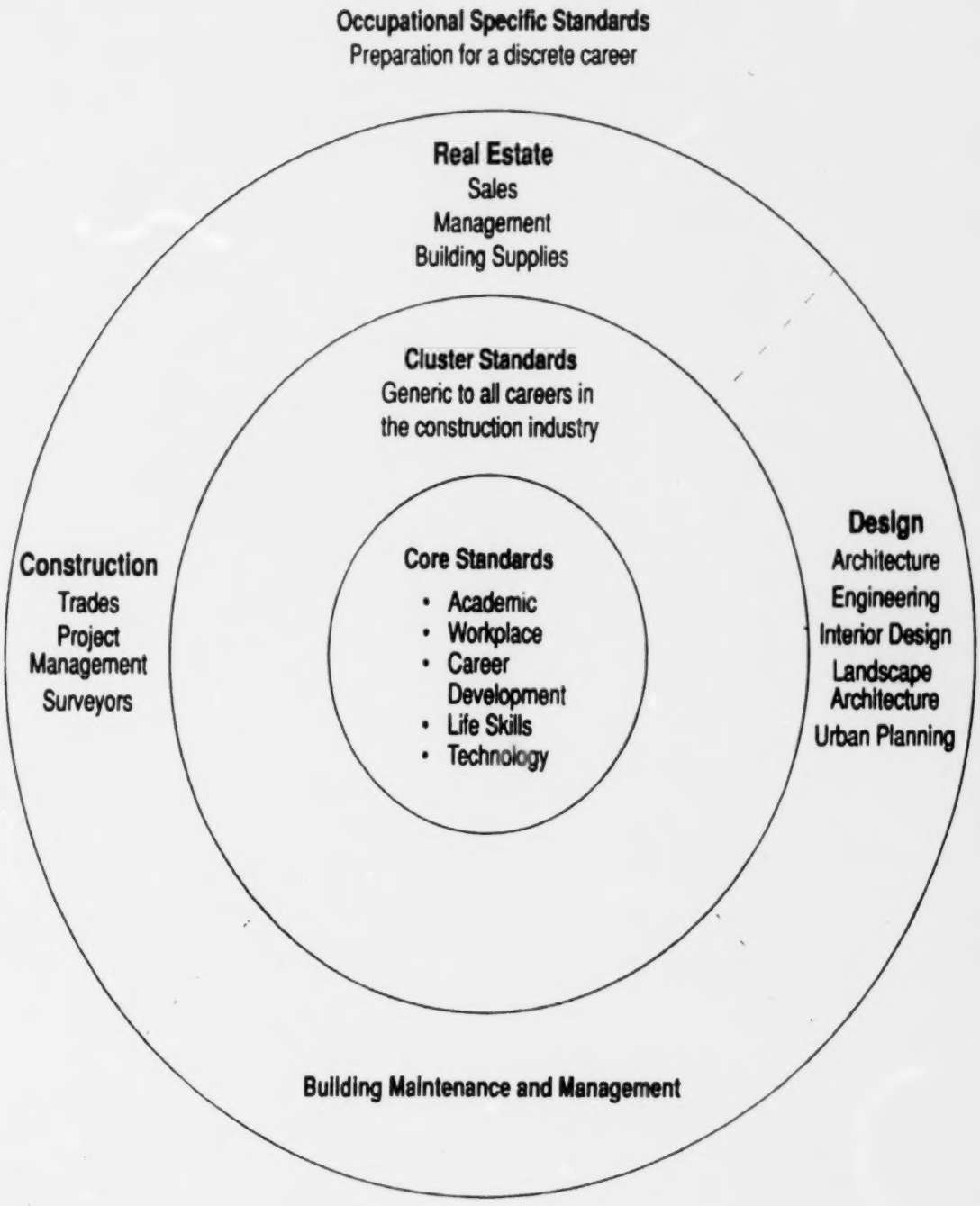
The resulting **Construction Cluster Skill Standards** and associated benchmarks, represent an intermediary step between core academic and generic workplace skills and more discrete occupation-specific standards as illustrated in the .Construction Industry Skills Standards Framework that follows.

Core Standards are those skills essential for all learners regardless of career goals. These include local and state academic standards as well as national career and workplace standards.

Cluster Standards refer to those competencies common to related occupations in an industry sector. They provide the broad foundation for entry level, technical and professional careers.

Occupational Specific Standards consist of technical skills and knowledge particular to a given occupation. Many of these are available at the state and national level.

Construction Industry Skill Standards Framework



Construction Cluster Skill Standards

- **Core Academic Standards**

  1. Understand and communicate effectively orally, in writing and graphically in standard English.
  2. Demonstrate knowledge and use of mathematical operations, measurement, algebraic and geometric methods to solve real world problems.
  3. Understand and apply the fundamental concepts, principles and processes of science to the construction industry.
  4. Demonstrate creative thinking, problem solving, decision-making and visualization.
  5. Apply computer literacy skills and knowledge.

- **Generic Workplace Readiness**

  1. Demonstrate knowledge and skills to make viable career choices and obtain employment in the broad construction industry.
  2. Demonstrate personal qualities of self-esteem, self-management and responsibility.
  3. Demonstrate acceptable behavior governed by the rules of society and the workplace.
  4. Demonstrate an understanding and ability to work with others.

- **Core Industry Standards**

  1. Demonstrate knowledge of the construction industry, related careers and economic issues that affect the industry.
  2. Apply technical skills and knowledge used in the industry
  3. Understand and apply workplace safety measures.

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Core Academic Standards

Standard 1: Understand and communicate effectively, orally, in writing, and graphically in standard English.

Benchmarks:

1. Communicates appropriately both verbally and non verbally with diverse audiences (e.g., coworker, supervisor, customer, or sub-ordinate).
2. Understands and uses technical terms used in the industry and the workplace.
3. Delivers oral presentations with clarity and organization.
4. Summarizes and paraphrases spoken messages orally and in writing.
5. Reads, interprets, and applies information from graphs, charts and tables.
6. Locates, reads and understands information in technical books, materials and newspapers.
7. Reads and applies information on labels and workplace signs.
8. Writes well organized and coherent reports, business letters and college applications using correct grammar, spelling, punctuation, capitalization and structure.
9. Understands the impact of inappropriate communication that can create a hostile work environment.

Standard 2: Demonstrate knowledge and use of mathematical operations, measurement, algebraic and geometric methods to solve real world problems.

Benchmarks:

1. Adds, subtracts, multiplies and divides whole numbers, decimals, and fractions.
2. Converts decimals to fractions and fractions to decimals.
3. Measures length, weight, volume, temperature and angles using appropriate standard and metric units, instruments and methods.
4. Calculates perimeter, circumference, area and volume.
5. Estimates and measures the magnitude and direction of physical quantities (e.g., force, velocity, scope).
6. Uses algebraic concepts and procedures to represent and solve problems.
7. Applies the concepts of ratio, percent and proportion to real-world situations (industry related and personal finance) and probability.
8. Represents and organizes data by creating lists, charts, tables, frequency distributions, graphs, scatterplots and boxplots.
9. Understands the relationship of math to built environment careers.
10. Selects and uses appropriate arithmetic operation in calculating wages after taxes, developing a budget, and balancing a checkbook.

Standard 3: Understand and apply the fundamental concepts, principles and processes of science to the construction industry.

Benchmarks:

1. Applies the concepts, principles and processes of scientific inquiry.
2. Understands chemical properties and change.
3. Understands and applies the principles of force and motion.
4. Understands electrical current.
5. Understands electrostatics.
6. Knows proper materials handling.
7. Knows soil density testing practices and procedures.
8. Understands global environmental concerns related to human modification of the earth's ecosystems.
9. Knows and applies the concepts, principles, and processes of technological design.

Core Academic Standards

Standard 4: Demonstrate creative thinking, problem solving, decision-making, and visualization.

Benchmarks:

1. Identifies and prioritizes problem.
2. Locates, acquires and organizes information from various sources.
3. Uses logical and sequential thought processes.
4. Formulates and proposes solutions or strategies to improve situation.
5. Pays attention to details.
6. Discovers rules and principles and applies them to a new situation.
7. Combines ideas or information in new ways.
8. Demonstrates forward-thinking.
9. Demonstrates three-dimensional thinking.
10. Demonstrates ability to analyze cause/effect relationships.
11. Selects solution and evaluates results.

Standard 5: Apply computer literacy skills and knowledge.

Benchmarks:

1. Knows the impact of technology on society and the industry.
2. Identifies and uses basic components of a computer system.
3. Demonstrates proper keyboarding technique.
4. Uses a word processing program to create documents and supporting visuals (e.g. letters, reports, graphs, charts).
5. Creates and uses a database as a tool for accessing, storing and interpreting information.
6. Creates and uses a spreadsheet as a tool to present, interpret and graph data.
7. Uses internet as a tool to access, retrieve and communicate information and ideas.
8. Understands and applies ethical uses of technology.

Generic Workplace Standard

Standard 6: Demonstrate knowledge and skills to make viable career choices and obtain employment in the built environment industry.

Benchmarks:

1. Understands the relationship between learning and work.
2. Understands how work relates to the needs and functions of the economy and society.
3. Locates, understands and uses career information.
4. Understands how societal needs and functions influence the nature and structure of work.
5. Understands developmental changes and transitions.
6. Understands the career planning process.
7. Understands the impact of sexual stereotyping on career choices, economic opportunity.
8. Identifies personal skills, abilities and career interests.
9. Develops an employment plan.
10. Prepares a resume.
11. Performs in a job interview.
12. Writes a job application letter.
13. Writes an interview follow-up letter.
14. Completes standard work forms
15. Investigates opportunities and options for business ownership.
16. Assesses own entrepreneurship skills and opportunities.

Standard 7: Demonstrate personal qualities of self-esteem, self-management, and responsibility.

Benchmarks:

1. Believes in own self worth and abilities.
2. Demonstrates friendliness and politeness in new and ongoing situations.
3. Demonstrates high level of effort and perseverance.
4. Takes initiative.
5. Demonstrates flexibility and adaptability.
6. Manages time well to accomplish short and long term tasks.
7. Demonstrates punctuality and dependability.
8. Perseveres and monitors progress towards goal attainment.
9. Dresses neatly and appropriately for school and workplace.
10. Maintains personal health and hygiene.
11. Practices stress management techniques.
12. Understands need to be a life-long learner.

Standard 8: Demonstrates acceptable behavior governed by the rules of society and the workplace.

Benchmarks:

1. Demonstrates honesty.
2. Demonstrates trustworthiness.
3. Demonstrates loyalty.
4. Demonstrates accountability.
5. Understands impact of violating ethical beliefs and codes on an organization, self and others.

Standard 9: Demonstrate an understanding and ability to work with others.

Benchmarks:

1. Demonstrates an understanding of cultural and interpersonal differences.
2. Shows respect for men and women of diverse backgrounds.
3. Contributes as a team member to a group effort.
4. Listens carefully to the views of others.
5. Tries to build consensus in group.
6. Shares expertise and learns from others.
7. Deals with criticism constructively.
8. Deals with conflicts appropriately.
9. Exhibits concern for others' needs.
10. Exercises leadership.
11. Understands equal employment opportunity laws and policies, including racial/sexual harassment prevention.

Standard 10: Demonstrate knowledge of the construction industry, related careers and economic issues that affect the industry.

Benchmarks:

1. Describes the various sectors in the construction industry and their inter-relationship.
2. Describes the impact of the economy on the industry.
3. Knows the various entities involved in the industry (e. g., unions, small businesses, companies, associations).
4. Describes the work and workplace of occupations in the industry.
5. Reports on the wages of workers in the construction industry.
6. Reports on the history of the construction industry in Illinois.
7. Describes local, state, and federal regulations affecting the industry.
8. Understands supply and demand concepts in relation to industry.
9. Describes construction needs relative to location, transportation, utilities, and labor supply.
10. Describes the mortgage loan process.
11. Describes how to run a construction business.
12. Reports on the cost of construction in Illinois.

Standard 11: Applies technical skills and knowledge used in the industry.

Benchmarks:

1. Correctly selects, uses and maintains tools of the industry.
2. Reads and interprets blueprints.
3. Demonstrates proficiency with manual drafting.
4. Demonstrates a basic proficiency with CAD.
5. Cleans and maintains work area.
6. Inspects and reports equipment failures.
7. Plans sequence of work operations.
8. Estimates time and cost to complete projects.
9. Receives, inspects and stores parts and supplies.
10. Determines appropriate materials and equipment needed for a job.

Standard 12: Understand and apply workplace safety measures.

Benchmarks:

1. Demonstrates knowledge and application of basic first aid.
2. Demonstrates knowledge and application of shop and workplace safety procedures.
3. Describes methods of treating hazardous materials.
4. Understands substance abuse policies in the workplace and how they relate to safety.
5. Understands business cost of an injury.
6. Reports shop, environmental and equipment safety violations and understands the importance of such reports.
7. Explains the term of proximity work.
8. Understands and practices safe lockout/tagout procedures.
9. Knows about use and care of personal protective equipment.
10. Follows safe lifting procedures.
11. Demonstrate knowledge of federal safety regulatory process and role of OSHA.
12. Explains the function of Material Safety Data sheets.
13. Practices fire prevention in dealing with various flammable materials.